DOD Executive Agency for LLRW

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the RAD WASTE NEWS

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Special points of interest:

- Please don't miss the last installment of a four part series on the disposition of unwanted radioactive material.
- You can save disposal costs using decay correction—see the story on page 5 for details!

So What *is* the Release Limit?

By Mike Styvaert

The Nuclear Regulatory Commission is moving towards making all radiological release limits site-specific and dose-based. For the decommissioning of soils, the licensee needs to demonstrate that the Total Effective Dose Equivalent (TEDE) to a member of the public will not exceed 25 mrem/year (100 mrem for special, restricted use scenarios) for the post decommissioned site. There are computer codes available for modeling the expected post-decommissioning TEDE. The two most readily available and acceptable models are Residual Radioactivity (RESRAD) and Decontamination and Decommisisioning (DandD). NRC Regulatory Guide DG-4006 provides information on the use and acceptance of other modeling methodologies. Both RESRAD and DandD are capable of calculating the TEDE for individuals exposed to residual building contamination and for soil contamination.

The calculated, site-specific surface or soils clean up levels are referred to as the derived concentration guideline limit (DCGL). The NRC calculated and published generic screening values in Federal Register Volume 62,

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TRANSPORTATION OF EXCESSED MATERIALS *by kelly crooks*

This is the fourth and final in the series for guidelines to follow in collecting and consolidating excess radioactive material in preparation for removal off-post. The series will be part of the Army Pamphlet 11-9, *The Army Radiation Safety Program*, when published.

ON-POST TRANSPORT

You may move excess radioactive material on your installation without the same requirements for movement off-post if public roadways are not used during transport. Follow the guides listed below:

a. Loading:

(1) Keep within weight limitation for the vehicle.

(2) Limit or arrange the containers to keep radiation exposures to personnel (including driver) as low as possible, e.g. put containers in back of truck away from cab.

(3) Block and brace or tie-down containers as necessary.

b. Do not haul loose radioactive materials. Keep tailgates closed.

c. Use sturdy containers which are sealed tight and free of contamination.

d. Use a suitable vehicle, e.g. one that is easily decontaminated if necessary. Do not use a privately owned vehicle. Leased or rented vehicles

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From the Desk of the Chief

As I read the working copy of this newsletter, I wondered which of our readers would read AND UNDERSTAND the technical information in many of our articles. Then I thought about our audience. Our readership varies from the radiation safety officer at unit or installation level to senior DOD health physicists. This newsletter has something for all.

I wish to publicly thank the St Louis District of the Corps of Engineers. Some time back in this column, I asked for help filling positions on our mobilization Table of Distribution and Allowances (TDA) for the Army Contaminated Equipment Retrograde Team (ACERT). The St Louis folks stepped forward and volunteered their services. We worked out a memorandum of agreement with them to provide help on a reimbursable basis if a contingency arises and we cannot meet it within our existing resources. Thank you St Louis District!

The national radioactive waste scene remains interesting.

South Carolina officially joined with New Jersey and Connecticut to form the Atlantic Compact. What that means for the Department of Defense is that over the next several years, access to disposal of some of our radioactive waste may be limited. Barnwell, the compact disposal site, will follow a compact imposed plan to ramp down the amount of waste that they will accept each year until they close access to out of compact waste completely. Currently, Barnwell takes Class A, B, and C waste. This includes sources from commodities such as chemical agent detectors, calibration sources and medical waste. The law signed by South Carolina Governor Jim Hodges repealed the portion of SC State code that banned North Carolina generators from the Barnwell site. North Carolina generators can once again ship LLRW to Barnwell.

In the meantime, Envirocare of Utah is applying for a Class B and C license to allow them to take some waste that Barnwell currently takes. This will give us another disposal option that is not currently available. Keep in mind that Envirocare's acceptance criteria is based on concentration (pCi/g) while Barnwell's is based on activity (Ci). So Envirocare still may not be able to take Class B and C discrete sources just like they can't take Class A sources now. They are targeting the power plant waste with that amendment. Thus, they will not necessarily fill that gap when Barnwell shuts everyone off.

The compact commissions are very active in making sure that all compact laws are followed. Since these laws vary from compact to compact, we must monitor import and export of DOD unwanted, excess radioactive material carefully. Our best advice here is that before any excess material is moved from one state to another for consolidation or recycle - check with us. We have long standing relationships with the compacts and will help interpret their rules to make sure that all laws are followed. Of course, before ANY disposal action, the disposal plan must be coordinated with our office. Army Regulation 11-9 and the DOD Charter which delineate our DOD mission for disposal are both very clear on this point.

You have heard of e-government well we are working on our own e-business project. We are developing a web-based tool that Army generators of low-level radioactive waste can use to provide us their requirements. The prototype should be ready this month. We will then thoroughly test it to make sure it works. What this tool will do is allow generators to provide us their disposal requirements in a standardized fashion. This will allow us to generate a database for tracking the disposal of the waste requirements. Right now, we do it all manually. It should make it easier for the user to request service and we will not have to ask as many questions of our customers. I will tell you more about this in the next newsletter.

We are getting close to having an official DOD regulation outlining low-level radioactive waste disposal policy. According to the action officer in the office of the Deputy Under secretary of Defense for Environmental Security, DOD 4715.6R will go to the publisher this month.

As usual, when I finish I wonder if I have remembered to tell you everything. If not, I will put it in next quarter's column.

Rosalene Graham

T-REX FOUND IN NEW MEXICO -"ALIVE"

by derek Cornette

T-REX is alive and well at the University of New Mexico. T-REX-The Transportation Resource Exchange Center- is an internet one stop shipping library and information center for the transportation of radioactive materials and waste. This site developed in conjunction with the National Transportation Program of the United States Department of Energy and the University of New Mexico has numerous links to International, Federal, State, Compact, and commercial information. There are publications and on line documents that relate to the transportation of radioactive material. This site leans heavily on the Department of Energy publications and links, but that should be expected since the DOE helped fund this site.

Listed below are "FACETS"-smaller specific categories of information- that are available at this website on the transportation of radioactive material and wastes.

Carriers - Information on truck, rail, ship, air and intermodal carriage. Topics covered include international and national carrier organizations, regulatory agencies, and carrier evaluation programs.

Economics - Current costs for transporting radioactive wastes and materials plus methods for calculating costs and research related to cost reduction.

Education/Training -Interactive tutorials, online training manuals and professional development courses for adults. Please check the News Room Events for workshop and conference schedules.

Emergency Management - Consists of emergency planning, preparedness, and response, as well as training facilities, materials and funding availability for these activities.

Environment - The following resources are part of this section: a searchable documents database by the DOE Office of Emergency Management documents on building stakeholder participation, public dialogue documents, site cleanup schedules and links to eight site-specific advisory boards.

Health - Information located here is related to organizations and research involved in human radiation protection, human health effects of radiation exposure and the use of nuclear medicine.

International - Groups in this section include global forums for scientific and technical cooperation and research, and international organizations working to solve waste management problems. Stages in the nuclear fuel cycle, and their implications, assessing geological disposal sites and communications and responses in radiological emergencies are among the many topics covered.

Laws - International, national, state, county, city laws and DOE national and site-level regulations, rules and codes about the transportation of radioactive waste and materials. Also included here are websites that interpret and give perspective to DOE regulations and explain external oversight of DOE.

Materials- Find transportation information based on the type of waste or material of interest here.

Packaging - Offers packaging information such as an availability database, packaging tests, designs, classifications, requirements and stakeholder involvement.

Public Participation - Search for citizen groups that are involved in the transportation of radioactive waste and materials at the international, national, state or DOE-site level.

Routes - The following resources are currently available here: text and map versions of routes, materials routing via disposition maps, route designation, historical shipping activities via routes and public information responsibilities.

Safety/Risk - Sites here include information on the following risk management concepts: assessment, evaluation, modeling, perception, communication, reduction, and consequences. Safety program websites, of varying size, location and responsibilities, are included.

States - Among the topics found in this section are the analysis and monitoring of laws, regulations and DOE activities, information for legislators and interested citizens and public involvement in decision-making. Other institutional, legal, policy-making and transportation issues are also present.

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Fort Detrick Sludge Transport and Disposal *by judy woodson*

What does the DOD Executive Agency for LLRW have to do with the transport and disposal of sludge? And how does this fit into the scheme of the Rad Waste world? Well …

Back in the good? old days (mid 1970s to 1988) Fort Detrick could make radiological releases (liquids radioactively contaminated with low levels of carbon, tritium, sulfur, etc.) into the sanitary sewer located on Army property. Fort Detrick owns and operates their own water treatment and sewer treatment plants. The installation treated the liquids at the wastewater treatment plant, dried the residual waste sludge in drying beds, and buried it at their on-site landfill.

Around 1988, during a routine inspection, the NRC became aware that the radiological releases were not made to a municipal system but to the installation's own wastewater treatment plant. Subsequent evaluation of the sewage sludge showed trace quantities of tritium and sulfur-35. For continued disposal of the sludge in the on-site landfill, the NRC wanted to approve the authorization to dispose of licensed material in a manner not typically prescribed (10 CFR 20.2002). However, the State of Maryland prohibits the burial of radioactive waste in their state permitted landfills. After failing on several attempts to obtain a reconsideration of the NRC ruling, Fort Detrick has discontinued radiological releases into the sanitary sewer. Currently, radiological liquids are disposed of commercially.

We arrange transport to, and dispose of, the sludge at Envirocare of Utah. Since the NRC only considers the sludge radioactive if the activity present is attributable to licensed activities, we anticipate that disposal will only be required through CY2000. Afterwards, the installation can resume burying the sludge on-site.

Any question or concerns can be addressed to Ms. Judy Woodson, DSN 793-1886, or (309) 782-1886, email: woodsonJ@osc.army.mil.

(EXCESSED MATERIALS …..continued from page 1)

leases may prohibit transport of hazardous materials.

e. Plan the route to avoid heavy traffic or personnel activity and explosives storage or handling. If deemed necessary by the RSO, notify the fire and military police departments of exact route and time to allow for special protective measures.

f. Check with the Safety Office for driver and radioactive material movement requirements. The driver may need a license for hazardous materials. A person trained on radiation safety should accompany the shipment.

g. As able, radiologically survey the vehicle prior to and after the movement.

OFF-POST TRANSPORT

Transport materials IAW Department of Transportation (DOT) regulations, Army and Operations Support Command requirements. We will make the shipment or provide detailed instructions for the installation to make the shipment. In addition:

a. Ensure proper blocking and bracing or tie-down of the containers.

b. Brief the driver or escort on the potential hazards and emergency procedures.

We hope that you have found this series helpful and informative. We have tried to provide you, the generator, with the guidelines needed for collecting and consolidating excess radioactive material in preparation for removal off-post. There are also considerations with state and regional compact regulations that regarding the export of excess material, material for recycle or waste for disposal. Our Charter makes us responsible for assuring the safe, cost effective and compliant disposal of all DOD LLRW and we know that there will always be questions and probably unique situations. Please direct your questions to Mr. Kelly Crooks, (309) 782-0338, email: crooksk@osc.army.mil.

GET THE FULL FOUR PART SERIES ON DISPOSITION OF UNWANTED RADIOACTIVE MATERIAL IN A .PDF FILE.

Just send an email and we will send you the complete four part article. Send your requests to: conleyr@osc.army.mil

Using decay correction to save money *by Dave Horton*

One of the places that we dispose of unwanted radioactive material is at the Barnwell facility in South Carolina. The amount we pay for disposal at this facility is based on a formula that includes a factor for the activity (or radioactivity) of the material.

A recent request to dispose of 66,000 Light Anti-tank Weapon (LAW) rocket sights is a good example of the chance to save big bucks through decay correction. These rocket sights each contained 3 millicuries (mCi) of promethium-147 (^{147}Pm) when we manufactured them.

Based on: the large number of sights, the relatively short half-life of ^{147}Pm, and knowing how old the sights are, we decay corrected the activity.

The decay of radioactive materials follows the basic equation of:

$$A = A_0 e^{-\lambda t}$$

where A = the activity after decay
A_0 = the initial activity
ë = the decay constant
t = the decay time

The decay constant is:

$$\lambda = \frac{\ln 2}{t_{1/2}}$$

or the natural log of 2 divided by the half-life.

Substituting the decay constant into the basic equation, we get:

$$A = A_0 e^{-\left(\frac{\ln 2}{t_{1/2}}\right) t}$$

For our LAW rocket sites we know that the initial activity, A_0, was 3 mCi and by looking it up in a table we know the half life of ^{147}Pm is 2.63 years. We have not produced any sights since 1975; therefore, we can use 25 years as a conservative estimate for the age of the sights. Plugging these numbers into our equation, we get:

$$A = 3\ mCi \quad e^{-\left(\frac{\ln 2}{2.63\ yrs}\right) 25\ yrs} = 0.004\ mCi$$

Based on this decay-corrected activity and the large number of sights, we will save approximately $22,000 on this disposal action.

If you have any questions on this subject, you can contact David Horton at (309) 782-1759, DSN 793-1759, or HortonD@osc.army.mil.

(LIMITS…. continued from page 1)

Number 222, November 18, 1998 for building surfaces and in Federal Register Volume 64, Number 234, December 7, 1999 for soils. Generally, RESRAD and D and D results can vary significantly for alpha emitting radionuclides. The generic default parameters built into the D and D model generate in many instances overly conservative DCGLs for alpha emitters. The RESRAD model allows for more flexibility in terms of inputting site-specific parameters.

The NRC has caveated the dose-based release limits with the statement that the licensee shall reduce any residual contamination “as low as reasonably achievable.” For the release of NRC licensed buildings and structures we have been specifying in our Operations Support Command (OSC) contracts that the contractor shall design the release surveys using the lower of the site-specific DCGL and the surface contamination limits specified in Army Regulation 11-9, *The Army Radiation Safety Program*. The AR 11-9 table is extracted from 10 CFR 835, Appendix D. In most instances, for beta-gamma emitters the AR 11-9 values dictate the DCGL and for alpha-emitters, the site-specific, dose-based values are the most conservative.

For tools, equipment and other materials intended to leave the licensed site, the surface contamination limits specified in the NRC "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Materials (NRC 1987), Office of Nuclear Material Safety and Safeguards (NMSS)," still applies. For release of a building that the licensee is planning to demolish, those limits also apply.

Please direct any technical questions to Mr. Mike Styvaert (309) 782-0880.

(TREX …..continued from page 3)

Students/Teachers - Educational activities for K-12 students and lesson plans for teachers.

Tribal - Cooperative approaches between states and tribes and principles for interaction with tribes by DOE are among the offerings in this section. You will also find information on the activism, rights, perceptions and capacity to administer transportation programs of tribal people.

This is a good site to find a considerable amount of information in a short time. This is a friendly T-REX. I give this site one and a half thumbs up— couldn't get to some of the sites from their links. Portions of this article were reprinted with permission. For more information about T-REX:

E-mail: trex@unm.edu
URL: www.trex-center.org
Toll-free: 1-877-287-TREX
Fax: 1-505-246-6001

For more information about the Alliance for Transportation Research Institute (ATRI)- www.unm.edu/~atr.

WE ARE STILL LEARNING - MORE TIPS FOR OVERSEAS SHIPMENTS

By Derek Cornette and William Huber

Well, we are back from another fabulous, fun-filled, frolicking tour of the Far East. Twenty-six days jam packed with work and travel - oh boy! As with most of our trips we picked up a few useful bits of information that we would like to pass on.

If you are using military air for shipment of radioactive material back to CONUS, be sure that you allow plenty of time for the local transportation office to move your material. We ran into a unique problem in Korea with the way they contract out small shipments to local carriers. Local contract carriers require a minimum load weight of 5,000 lbs. This trip it took two days to resolve but on future trips, armed with this information, we will be able to plan for this type of eventuality.

When using military air for shipments to CONUS, be willing to baby-sit the material to make sure that it gets on the next available flight and does not end up as a frustrated shipment. This means that you may have to rewrite the dangerous goods bill, explain the regulations to them, or point out the authorizing regulations. The MILAIR personnel are great and they know their job well but they just do not see many radioactive shipments. Each loadmaster and base have their own way of doing things and there are small variations that you will have to accommodate or the shipment will be frustrated.

Remember the MILAIR personnel can only use the info that is in their manual, AFJMAN 24-204. If it is not in there, or something has changed and their manual is out of date, they have to use what is in their manual. This is one battle you will not win.

Never ever, use the word "WASTE" unless the material meets the definition of waste in 40 CFR. This will stop a shipment faster than anything. It may be a hazardous material or hazardous substance but radioactive material is never a hazardous waste by itself. To eliminate this problem we removed the word "waste" from our manifests.

If you are using FedEx in CONUS to ship radioactive material be willing to baby-sit the material again. In Hawaii, we wrote about twenty Dangerous Goods Bills. Be sure to check with the appropriate FedEX Dangerous Goods Office to assure that you are following current procedures. The driver that picked it up did not want it and we knew that there would be a delay so we went to the Fed Ex office and sat until it came and worked with their dangerous goods person. He did not like the way that we had filled out the dangerous goods bill. Anyway, to make a long story short, the dangerous goods person accepting the material is the final say as to whether it gets on their plane or not. Make him or her HAPPY and the material will move.

If the material is going by boat back to CONUS, be willing to go to the docks to make sure the shipping company accepts the material. Once that "accepted" stamp hits the paper you are golden. However, there may be an hour of explaining what you have and why you did certain things before that stamp comes down.

Be careful what you ask for. If you pack the radioactive material in freight containers, the size you ask for may cause you a lot of trouble. Some carriers have unique requirements and may be challenging to work with . It can take up to a month to get all of their required paperwork approved and get approval of the carriers dangerous goods representative. Once again, pre-planning can save time and trouble—find out what size containers your carrier has, and ask for one of them.

Well, that is what we picked up this trip. If you have any questions contact us. Please direct your questions to Derek Cornette DSN 793-1736 or (309) 782-1736, email: cornetted@osc.army.mil. We will be glad to help if we can. Happy traveling and safe shipping.

SERVICE AND AGENCY POINTS OF CONTACT

Air Force:	CAPT Maridee Cornell (210) 536-3489 AFIERA/SDRH (AFRMWO) Brooks AFB, Texas 78235	**USACE:**	Mr. Richard Wright, Jr. (202) 761-8565 Corps of Engineers CESO— 441 G. Street Washington, DC 20314-1000
Navy:	Mrs. Laurie Lowman (757) 887-4692, % Naval Sea Systems Command Detachment, Radiological Affairs Support Office Yorktown, VA 23691-0260	**DLA:**	Mr. Mike Coogen, DLA-OWP (703) 767-6231/6300 Defense Logistics Agency Ft. Belvoir, VA 22060-6221

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